# Research Integrity:

# Beyond "Don't Be Evil!"

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# Research ethics training often falls short

- Typically cast as something we *need* to do because of agency rules, strings attached to funding, etc.
- Often focused on defining misconduct, then exhorting participants not to commit it.

# Typical response to this training

- Do you think we don’t know this?
- Do you think we’re evil?
- Why are you taking up time we could be using to do research?

# Big ideas about research integrity

- Driven by values internal to science *and* by external obligations to the public.
- An individual project (your choices & behaviors) *and* a collective project (how institutions & communities act).

# Big ideas about research integrity

- Defined misconduct is a bright line, but there's more to research ethics than avoiding misconduct.
- Researchers are human. This matters for how we understand and address research integrity.

# Crucial fact about science:

Building objective, reliable knowledge about the world requires teamwork.

(Norm of "organized skepticism")

# Internal values

Science and engineering aim to build reliable knowledge about the world and new technologies that work in the real world.

Both require researchers to coordinate their efforts to work with other humans.

Honesty + Fairness

# Sharing a world brings more duties…

- Research affects the world for people who aren't researchers.
- Public funds support research *and* the training of scientists and engineers.
- Arguably, researchers' specialized abilities give them special duties to the rest of society.

# Scientists against regulation

- Might inhibit creativity.
- Fundamental ambiguity of research would expose innovators to charges of misconduct.
- Reproducibility - scientific cheaters will be caught, eventually.
- Regulations imposed on science from without not cost-effective.

**That regulation has been scandal-driven is a recognition that self-regulation has failed.**

# Definitions of misconduct

Recommended by National Academy of Sciences, adopted by PHS, NSF, et al.:

Scientific misconduct is **fabrication**, **falsification**, and **plagiarism** in proposing, performing, or reporting research.

# High crimes against science

- **Fabrication**: making up data or results
- **Falsification**: changing real data by adjusting values, adding data points, or omitting data points
- **Plagiarism**: misrepresenting someone else's words, ideas, methods, or results as your own

# Fabrication, falsification damaging to scientific knowledge-building

- Knowledge-building requires **truthfulness** about observations and experimental conditions.
- Made-up data **can't** be good evidence for or against a theory, for or against the successful operation of a technology.

# The problem with plagiarism

- Dishonesty about the source of words, ideas, methods, or results.
- Dishonesty might be habit-forming.

# Kenneth D. Pimple on plagiarism:

"One ideal of science, identified by Robert Merton as 'disinterestedness,' holds that what matters is the finding, not who makes the finding. Under this norm, scientists do not judge each other's work by reference to the race, religion, gender, prestige, or any other incidental characteristic of the researcher; the work is judged by the work, not the worker. No harm would be done to the Theory of Relativity if we discovered Einstein had plagiarized it…"

Pimple, K. D. (2002). Six domains of research ethics. *Science and engineering ethics*, *8*(2), 191-205.

# Kenneth D. Pimple on plagiarism:

"[P]lagiarism … is an offense against the community of scientists, rather than against science itself. Who makes a particular finding will not matter to science in one hundred years, but today it matters deeply to the community of scientists. Plagiarism is a way of stealing credit, of gaining credit where credit is not due, and credit, typically in the form of authorship, is the coin of the realm in science." (p. 196)

Pimple, K. D. (2002). Six domains of research ethics. *Science and engineering ethics*, *8*(2), 191-205.

# Kenneth D. Pimple on plagiarism:

- Doesn't directly undermine knowledge-building
- Does deprive scientists of appropriate credit

A problem because it's unfair.

# Plagiarism as an epistemic problem:

- Sharing findings and conclusions involves a **dialogue** between scientists.
- Plagiarism undermines that dialogue.
- Plagiarist **can't** answer questions actual author could.
- Plagiarist **isn't** contributing his own insight.

Plagiarism *also* undermines knowledge-building.

# Broader definitions of misconduct

Previous definition (c. 1990):

Scientific misconduct is fabrication, falsification, plagiarism, or other serious deviations from accepted research practices.

# “Other serious deviations…”

- Sabotaging experiments or equipment
- Falsifying colleagues’ data
- Violating agreements on sharing materials
- Making misrepresentations in grant proposals
- Violating confidentiality of peer review
- Sexually harassing trainees

# Concerns about "other serious deviations"clause:

- Might squelch innovation (new techniques & theories depart from those currently accepted).
- Might enable frivolous charges.
- Too vague to be easily adjudicated.

But without "other serious deviations," *only* FF&P count as misconduct.
Does this mean all other behavior is fine?

# Buzzelli on "other serious deviations":

"I suggest that NSF, unlike the Academy panel, understands 'deviation from accepted practices' in an ethical sense. The way to commit misconduct in science is to do something that scientists would recognize as deviating seriously from professional standards. The panel evidently took 'accepted practices' to mean accepted ways of doing experiments. Deviating from those does not ordinarily involve any ethical violation and has nothing to do with misconduct."

Buzzelli, D. E. (1993). The definition of misconduct in science: a view from NSF. *Science*, *259*(5095), 584-648.

# Ryan Commission's (1995) definitions

- Misappropriation (including plagiarism & violations of confidentiality of peer review)
- Interference (including sabotage & cover-ups)
- Misrepresentation (including presenting falsehoods & omitting significant facts)

# Misdemeanors against science

- Not publishing your findings
- Publishing too much ("least publishable unit")
- Not citing **first** observation of phenomenon
- Citing sources you haven't actually read
- Not citing sources that **don't** support your hypothesis

Zigmond, M. J., & Fischer, B. A. (2002). Beyond fabrication and plagiarism: The little murders of everyday science. *Science and engineering ethics*, *8*(2), 229-234.

# Misdemeanors against science

- Methods sections with inadequate information for replication
- Results sections that don't include data that are supposed to support the conclusions
- Inappropriate statistical tests
- Misleading plots
- Unclear writing

Zigmond, M. J., & Fischer, B. A. (2002). Beyond fabrication and plagiarism: The little murders of everyday science. *Science and engineering ethics*, *8*(2), 229-234.

# Misdemeanors against science

"Inattention to the misdemeanors, or little murders, may have multiple consequences. It may communicate the wrong message about the value of responsible conduct to our community and to the public-at-large. It may also contribute to a climate in which ethical concerns are generally disregarded, and inadvertently provide positive reinforcement to individuals sliding down a slippery slope." (233)

Zigmond, M. J., & Fischer, B. A. (2002). Beyond fabrication and plagiarism: The little murders of everyday science. *Science and engineering ethics*, *8*(2), 229-234.

# Spirit of the rules:

Behavior that threatens the integrity of the scientific record or the ability of researchers to coordinate their efforts to build reliable knowledge & technologies is bad behavior.

Researchers shouldn't do it.

Researchers shouldn't tolerate it.

The public shouldn't fund it.

# Bad behavior isn’t just a matter of ”bad apples”

- Features of research environment matter a lot for what kind of behaviors are tolerated.
- Especially important: structure of rewards and punishments.

# What "counts" for distribution of funding, promotions, etc.?

- Being first to report a novel finding.
- Not: reporting results that replicate someone else's findings.
- Producing many Ph.D. trainees.
- Not: doing lots of hands-on mentoring or coordination of their labor.

# Perverse incentives

- Rational for individual scientists to produce more faster
- … even by cutting corners.
- … even by abusing underlings.

Even if this undermines the goals of good scientific knowledge-building.

# Cheating as response to environment

If selection pressures require more results quicker than competitors, one way to survive is to make stuff up.

(System of external rewards drives “adaptive” behavior that’s bad for knowledge-building)

# Research ethics enforcement

- Mechanisms to deal with misconduct that researchers are hesitant to use.
- Not using designated mechanisms leads to recidivism and cynicism, plus uncorrected errors in the scientific literature.

# How to address misconduct?

- Proactive: Education
- Reactive: Penalties to punish, isolate wrongdoers. Correction of the scientific record.

If there is no penalty, undermines trust in community.

# Interests of the rest of the scientific community:

- Being able to trust journal articles, conference presentations, grant applications, private communications.
- That dishonesty will be exposed when detected.

# Practical problem with enforcement:

Most scientists who become aware that another scientist has committed misconduct **don't** use official channels to report it!

Why not?

- Treatment of whistleblowers
- Fear of scandal/harm to organization
- Sympathy for offender

# Scientists as humans

If cheater is someone we know & like:

"It was a dumb mistake, a lapse in judgment when they were under pressure, not who they really are."

Other cheaters: violators of trust, people with bad character, monsters.

# Perceived range of possible sanctions affects enforcement

- Permanent expulsion*
- Slap on the wrist

**Is rehabilitation possible?**

*Effect of 3 year debarment from funding, early in career, can be permanent in current competitive climate!

# How to deal with "youthful offenders"?

- Expunge the record?
- Require restitution?
- Make offenses public and ask community to take responsibility for providing better guidance?

Rehabilitation assumes people can **learn from their mistakes**.

# Does current climate in science make rehabilitation practical, or even possible?

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**Theme: Scientific Ethics**

## Life after Misconduct: Promoting Rehabilitation while Minimizing Damage

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**The scientific community has an interest in dealing with misconduct, but also in providing a path to rehabilitation in the aftermath of misconduct. The prospect of rehabilitation could minimize harms by improving reporting of misconduct, rebuilding damaged trust, and providing more insight into the conditions that led to unethical behavior, allowing scientists to work collectively to create conditions in which scientific misconduct is less likely.**

Why don't we intervene to counter harmful behaviors well before they cross the line to misconduct?

# Where we are

Standard approach to research ethics training and enforcement seems insufficient to effectively address problematic behaviors.

# What else have you got?

Key insights:

- Science is a fundamentally human activity.
- Features of research environments matter a lot to what kinds of behaviors are adaptive or even possible.

# What else have you got?

Broad recommendations:

- Refocus how we understand ethics (something that supports knowledge-building).
- Address features of research environments to enable better behavior.

# How to fix research environments?

- Change structure of competition (what's rewarded/punished).
- Mitigate power disparities in existing competition.
- Culture change to foster cooperation.

# Research ethics training:

- How should we behave to be successful knowledge-builders?
- How should we treat each other to strengthen our knowledge-building capabilities?
- How should we share a world with others who happen not to be scientists?
- How can we structure things so we *can* behave how we *should* behave?

# Things worth trying:

- Research plans that include "organized skepticism"/checking by other teams.
- Tangible rewards for active mentoring.
- Routine discussions of ethical challenges at group meetings.

# Everyday ethics:

- How should we evaluate our data & results to avoid misleading others or fooling ourselves?
- What happens if the project doesn't work the way we hope or expect it to?
  - What do we learn?
  - How do we explain it to funders, managers, potential employers?

# Changing our culture is hard!

But researchers do hard things every day!

And, changes that make it easier to trust the literature and other researchers so we can focus on solving the research problems will be worth the effort!